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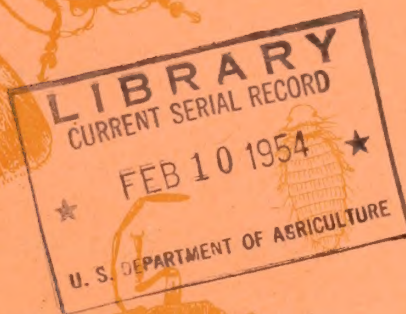
Cooperative ECONOMIC INSECT REPORT

Issued by

Reg. Program
PLANT PEST CONTROL BRANCH

AGRICULTURAL RESEARCH SERVICE

UNITED STATES DEPARTMENT OF AGRICULTURE



AGRICULTURAL RESEARCH SERVICE

PLANT PEST CONTROL BRANCH

ECONOMIC INSECT SURVEY SECTION

The Cooperative Economic Insect Report is issued weekly as a service to American Agriculture. Its contents are compiled from information supplied by cooperating State, Federal, and industrial entomologists and other agricultural workers. In releasing this material the Branch serves as a clearing house and does not assume responsibility for accuracy of the material.

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Economic Insect Survey Section
Plant Pest Control Branch
United States Department of Agriculture
Washington 25, D. C.

COOPERATIVE ECONOMIC INSECT REPORT

Highlights of Insect Conditions

GREENBUG increasing in central Oklahoma area. (page 22).

MITES continue to damage small grains in south central and north central Texas. (page 22).

Summary of INSECT CONDITIONS - 1953 - in Tennessee (page 29) and vegetable insect conditions in New York - 1953. (page 31).

Summary of ARMYWORM outbreaks in the United States - 1953. (page 33).

A survey of INSECT INFESTATION of wheat in the field. (page 25).

Reports in this issue are for the week ending January 8 unless otherwise designated.

WEATHER FOR THE WEEK ENDING JANUARY 12, 1954

Although the past week's weather averaged warmer and drier than normal in most sections of the Country, unusually low temperatures occurred in some northern sections east of the Continental Divide and very beneficial precipitation fell in the South and Atlantic Coastal States. In the far West the weather was unseasonably warm and dry throughout the week, except in Washington, Oregon, and northern California where general rains maintained good soil moisture conditions. In New Mexico, Arizona, and southern portions of (Weather Continued on page 27).

CEREAL AND FORAGE INSECTS

GREENBUG (Toxoptera graminum) TEXAS - No greenbugs have been found in Texas to January 8 except as previously reported (see CEIR, Vol. 3, No. 52, p. 858) in the Panhandle. (Davis, Daniels, Chada). OKLAHOMA - Have increased during the past month throughout the central area. Many of the fields now have from 2 to 8 per linear foot. (Dahms). SOUTH CAROLINA - Present in most grain fields but causing little injury, Charleston area. (Cuth.).

ENGLISH GRAIN APHID (Macrosiphum granarium) - OKLAHOMA - Found at rate of 10 to 20 per linear foot in early-seeded wheat in central area. (Dahms).

CUTWORMS - OKLAHOMA - Some being found in small numbers in central Oklahoma wheat. (Dahms). TEXAS - Found in one small grain field north of Stephenville. Most larvae extremely small, so impossible to tell possibilities of widespread infestation. (Davis, Daniels, Chada).

A GRAIN MITE (Penthaleus major) - TEXAS - A recent survey of small grain pests was made through south central and north central Texas. Penthaleus major can be found in many fields from the Oklahoma state line South to Dallas and Ft. Worth, southward to south of Temple and Marlin. Many fields in this area are quite heavily infested and damaged. Infestations also in Comfort-Kerrville area. Cold weather in north central area has slowed development and damage, but has not seemed to have reduced numbers. The second brood is now developing as is evidenced by the large numbers of newly-hatched larvae and nymphs. With warmer weather, it is expected that there will be considerable damage to small grains in infested fields during January and February. Quite a few predacious mites found in many infested fields; however, value of these predators for control of P. major is not known. (Chada, Davis).

FRUIT INSECTS

Citrus Pest Conditions: CALIFORNIA Some local but severe infestations of CITRUS RED MITE (Metatetranychus citri) in Tulare County. Serious in a few orchards in Riverside County. Light to medium in Santa Barbara County and some heavy infestations in Orange County citrus. CITRUS RUST MITE (Phyllocoptruta oleivora) was locally heavy in Orange County. Light to severe infestations of SOFT SCALE (Coccus hesperidum) and CITRICOLA SCALE (Coccus pseudomagnoliarum) in Tulare County. CALIFORNIA RED SCALE (Aonidiella aurantii) was locally severe in Tulare County and heavy in two areas in San Bernardino County. YELLOW SCALE (Aonidiella citrina) was light to severe in Tulare County and heavy on orange trees in Colusa County. (Coop. Ins. Pest Rept., Dec.).

FLORIDA - Reduction in activity of PURPLE SCALE (Lepidosaphes beckii) and some further reduction expected. FLORIDA RED SCALE (Chrysomphalus aonidum) activity increasing sharply as result of increase in hatching. Hatch expected to be short with no major increase. CITRUS RED MITE increasing some and further increase expected. CITRUS RUST MITE activity declining on both leaves and fruit but still high on leaves. (Pratt, Thompson and Johnson, 4th wk. Dec. Rept.).

EUROPEAN RED MITE (Metatetranychus ulmi) - CALIFORNIA - Large numbers of eggs on prune trees in Napa County. (Coop. Ins. Pest Rept., Dec.).

OLIVE SCALE (Parlatoria oleae) - CALIFORNIA - Widespread infestation on olives and ornamentals in Tulare County. Light to medium in Merced County olive orchards. (Coop. Ins. Pest Rept., Dec.).

TRUCK CROP INSECTS

CABBAGE APHID (Brevicoryne brassicae) - SOUTH CAROLINA
Light but fairly general in buds of young cabbage in Charleston area.
(Cuthbert).

VEGETABLE WEEVIL (Listroderes costirostris obliquus) - SOUTH
CAROLINA - Larvae abundant on mustard in garden in Dorchester
County and on turnips in Charleston County. (Cuthbert).

ARTICHOKE PLUME MOTH (Platyptilia carduidactyla) - CALIFORNIA -
Damage as high as 75 percent in Santa Cruz County. Though harvest
low during December in San Mateo County, damage 15 percent of
harvested crop. Heavy losses in Santa Barbara County. (Coop. Ins.
Pest Rept., Dec.).

SEED-CORN MAGGOT (Hylemya cilicrura) - SOUTH CAROLINA
Light to moderate infestation in buds of spinach in Charleston area.
(Cuthbert).

A LEAF MINER (Liriomyza sp.) - CALIFORNIA - Unseasonably
heavy infestation on onions in Los Angeles County. (Coop. Ins. Pest
Rept., Dec.).

See page 28 for other truck crop notes.

INSECTS AFFECTING MAN AND ANIMALS

NORTHERN FOWL MITE (Bdellonyssus sylviarum) - CALIFORNIA -
Depluming chickens in cages in one locality in El Dorado County.
Second infestation reported in State during 1953. (Coop. Ins. Pest
Rept., Dec.).

HOUSE FLY (Musca domestica) - CALIFORNIA Very greatly reduced
in Sacramento County from more than normal numbers of 1951 and 1952.
(Coop. Ins. Pest Rept., Dec.).

STORED-PRODUCT INSECTS

NAVEL ORANGEWORM (Myelois venipars) - CALIFORNIA Severe
damage to almonds in storage in one area of Merced County. (Coop.
Ins. Pest Rept., Dec.).

A Survey of Field Infestation of Wheat^{1/}

At a meeting of the National Soft Wheat Millers Association in Louisville, Kentucky in January 1953, the question arose regarding the possibility of field infestation of wheat. Four entomologists attending the meeting, T. H. Parks, Herman King, J. G. Rodriguez and G. E. Lehker, agreed that data were needed to settle the question. Later Mr. Lehker, a spokesman for the group, asked the USDA Manhattan Kansas laboratory to organize such a survey and examine the samples.

Nine States were included in the survey extending from the Gulf to the Great Lakes. Entomologists in each State collected the samples and forwarded them to Manhattan where the insect counts were made. Pint samples of wheat were taken directly from the combine at locations approximately 10 miles apart from about 10 counties, running from south to north. A summary of the results is given in table 1.

Of 132 samples taken from 72 counties, 5 contained insect infestation. No infestations were found in samples from Kansas, Michigan, Mississippi, Missouri, or Oklahoma. In Indiana, 1 dead Angoumois grain moth was found in a sample from Posey County. In Kentucky, 1 confused flour beetle was found in a sample from Mercer County. This insect does not fly so presumably originated from an infestation in the combine. In Alabama one sample from Limestone County showed infestation. When received the sample contained 1 dead saw-toothed grain beetle and 1 Indian-meal moth larva. Later 8 saw-toothed grain beetles, 1 flat grain beetle, and 1 Indian meal moth were bred from this sample. Since the saw-toothed grain beetle is not known to fly, it is questionable whether this infestation is a true field infestation.

^{1/} This report is condensed from Special Report A-72, Division of Stored Products Insect Investigations, Bureau of Entomology and Plant Quarantine, by R. T. Cotton, G. D. White, and James Quinlan. Report A-72 is not available for distribution.

In Ohio one sample from Ross County contained a dead Angoumois grain moth when received. A sample from Clinton County contained on receipt 2 granary weevil adults, 4 saw-toothed grain beetle adults, and 1 cadelle larva. Subsequently, 73 granary weevils were bred from this sample. Since neither the granary weevil nor the saw-toothed grain beetle flies and the cadelle larva would have required several weeks to develop, this infestation could not have originated in the field. Investigation showed the sample had been taken from a load of the first wheat combined that year and it was presumed that the sample contained old wheat that had remained in the combine from the previous year.

It was concluded that from the data obtained in this survey, there is no evidence to support the belief that field infestation by the rice weevil is common.

Table 1. Insects reared from samples of wheat collected from nine States.

State	No. of Coun- ties	No. of Sam- ples	Insects found in samples	
			When received	After 3 months storage
Ala.	6	12	1 saw-toothed grain beetle 1 Indian-meal moth	8 saw-toothed grain beetles 1 flat grain beetle 1 Indian-meal moth
Ind.	10	27	1 Angoumois grain moth dead	0
Kans.	4	12	0	0
Ky.	6	19	1 <u>Tribolium</u> <u>confusum</u>	0
Mich.	8	16	0	0
Miss.	1	1	0	0
Mo.	9	15	0	0
Ohio	17	19	4 saw-toothed grain beetles 2 granary weevils 1 cadelle larva 1 Angoumois grain moth	73 granary weevils
Okla.	11	11	0	0

(Div. of Stored Prod. Insects Investigations).

RECENT IMPORTANT INTERCEPTIONS AT PORTS OF ENTRY

Insect Interceptions in fresh fruits from foreign countries at various ports recently included the following: Anastrepha ludens in grapefruit, mangoes, oranges and quinces from Mexico at Laredo (Averill, Baker, Jackson, Noel, Ragsdale, Volle) and in grapefruit from Mexico at Galveston (Trigg, Vitrano); a species of Olethreutidae, doubtfully Argyroplece leucotreta Meyr. in grapefruit from Nigeria at Boston (Garrett); a species of Tortricidae, Archips doubtfully pronubana Hbn. in pomegranate from Yugoslavia at Philadelphia (Kennelty); and sp. of Tephritidae, possibly Dacus dorsalis Hend. in grapefruit from Ceylon at Savannah (Pruitt).

Weather Continued.

California, Nevada, and Utah, ranges and grains continued to suffer and the shortage of stock water was becoming more extensive. Light to locally moderate rain at the end of the period slightly eased the droughty condition in southern coastal sections of California. In the northern Rocky Mountain States temperatures averaged 10° to 15° above normal and about 10° warmer than the previous week. Also, as the surface soils dried under the influence of the unseasonably warm dry weather, occasional high winds caused soil blowing in several localities. In the eastern half of the Nation unseasonably mild, dry weather prevailed until the week end, except for a cold snap in the extreme southeast on the 7th and 8th when freezing occurred in northern Florida and scattered frost was reported southward into the Everglades. During the latter part of the period as successive cold Arctic air masses overspread the entire East and South, heavy thunder showers occurred in the South and moderate to heavy snows in middle and northern sections. Rainfall that generally exceeded 2 inches in Arkansas, Louisiana, and Mississippi should greatly help to replenish subsoil moisture in those areas. As a storm moved up the Atlantic Coast on the 10th and 11th, heavy snow fell in the North Atlantic Coastal States, slowing traffic and resulting in many accidents. Moderate to heavy snow also fell in a belt extending from the Virginias southwestward through Kentucky, Tennessee, northern Mississippi, northern Arkansas, and east central Oklahoma where 1 to 4 inches of snow still covered the ground at the end of the period. The snow and rains were followed by much lower temperatures. (Summary Supplied by U. S. Weather Bureau).

TRUCK CROP INSECTS CONTINUED

Truck Crop Insect Conditions in Texas: ONION THRIPS (Thrips tabaci) increasing throughout the Lower Rio Grande Valley. Light on onions. CABBAGE LOOPER (Trichoplusia ni) and DIAMOND-BACK MOTH (Plutella maculipennis) medium widespread on cabbage in Hidalgo area. (Wene). WIREWORMS heavy on carrots locally in Mission area. (White). FALSE CHINCH BUG (Nysius ericae) causing some damage to mustard in small gardens. TOMATO FRUITWORM (Heliothis armigera) continued to cause some damage to tomatoes during first part of December. BUDWORMS found damaging spinach. CABBAGE LOOPERS and CORN EARWORM have ceased to cause much damage to cabbage and lettuce. (Richardson, Dimmit County).

SUMMARY OF INSECT CONDITIONS 1953

TENNESSEE

Reported by R. P. Mullett

Cereal and Forage Insects: The most serious insect outbreak of the year for the entire State was the ARMYWORM (Pseudaletia unipuncta) attack which began about the middle of May and ran through the middle of June. Around 400,000 acres in 60 counties were infested. Controls were applied to between 150,000 and 200,000 acres. At one time about 50 airplanes were in operation simultaneously. East Tennessee, east of Knoxville, was widely and severely infested for the first time since 1945. EUROPEAN CORN BORER (Pyrausta nubilalis) was prevalent over most of the State. Except for an occasional heavily infested community, infestations were moderate and did not cause too much damage. Very large numbers of CORN EARWORM (Heliothis armigera) were present over the State early in the season in whorls of young corn. Many fields were 100 percent infested. Some fields sustained heavy damage. A few scattered infestations of FALL ARMYWORM (Laphygma frugiperda) were found in buds of late corn and a few armies of this insect showed up in pasture fields in East and Middle Tennessee. SORGHUM WEBWORM (Celama sorghiella) and CORN EARWORM caused some damage to sorghum. BLISTER BEETLES were present in moderate numbers on alfalfa, corn, truck and vegetable crops. SEED-CORN MAGGOT (Hylemya cilicrura) appeared in the spring over a wide area in Middle and West Tennessee, resulting in numerous losses to stands of corn, cotton, and vegetables. GRASSHOPPERS were numerous, causing damage to corn and alfalfa fields.

Cotton Insects: Extremely large numbers of BOLL WEEVIL (Anthonomus grandis) emerged in the spring in the southern half of West Tennessee. Large numbers had gone into hibernation and survival was high. Few weevils were present in the spring in the south Middle Tennessee cotton belt. Hot dry weather checked the population during the summer, but did not completely control it and economic damage was sustained in the ten southwestern counties.

Moderate numbers of COTTON FLEAHOPPER (Psallus seriatus) were present in all cotton counties causing some damage. This is the first time the fleahopper has appeared in the State in several years in any number. THRIPS damage to seedling cotton was widespread and heavy although no stands were killed. BOLLWORM damage, despite the huge number of corn earworms present early in the season, was light. One or two fields of cotton in West Tennessee had a very, very few COTTON LEAFWORMS (Alabama argillacea); however, there was no damage from this pest in 1953.

Vegetable Insects: The common vegetable insects were present in normal numbers except MEXICAN BEAN BEETLE (Epilachna varivestis), which during the hot weather was reduced to a minimum. BLISTER BEETLES were common in gardens throughout the year.

Tobacco Insects: APHID infestations were negligible. A few VEGETABLE WEEVILS (Listroderes costirostris obliquus) were found attacking occasional tobacco beds in eastern and Middle Tennessee. Damage was slight. HORNWORMS were generally present over the State, although damage was not too heavy. GRASS-HOPPERS caused heavy damage to many fields in eastern and Middle Tennessee.

Stored-Grain Insects: Around a million bushels of stored wheat were inspected over the State. About 5 percent heavily infested, while the remainder was very, very lightly infested. The following insects were found: Indian meal moth (the most prevalent pest), Angoumois grain moth, rice weevil, cadelle, mealworms, saw-toothed grain beetle, lesser grain borer and psocids.

Shade Tree and Forest Insects: Large numbers of ELM LEAF BEETLE (Galerucella xanthomelaena) caused considerable defoliation of elm trees throughout the State, as did LOCUST LEAF MINER (Chalepus dorsalis) on locust. MIMOSA WEBWORM (Homadaula albizziae) caused only scattered defoliation of mimosa trees. VARIABLE OAK LEAF CATERPILLAR (Heterocampa manteo) defoliated vast acreages

of oak trees in western Middle Tennessee. Large numbers of PERIODICAL CICADA (Magicicada septendecim) appeared in scattered areas in East Tennessee. Some damage to orchards.

Household Pests: BOXELDER BUG (Leptocoris trivittatus) was a nuisance to householders across the State as were FLEAS and CLOVER MITES. TICKS in houses and on pets were reported during the spring and fall. Many reports of TERMITE infestations came in during the spring.

Truck Crop Insects In New York-1953

Reported by R. W. Leiby

CABBAGE MAGGOT (Hylemya brassicae) was present in average numbers on crucifers but injury to young plants would have been severe if adequate control practices had not been followed. SEED CORN MAGGOT (H. cilicrura) caused some losses to early-planted dry beans and lima beans except where seed was treated. ONION MAGGOT (H. antiqua) was not destructive, nor was CARROT RUST FLY (Psila rosae) a problem. TOMATO RUSSET MITE (Vasates lycopersici) was reported from one field and in one greenhouse on tomatoes. Slight POTATO APHID (Macrosiphum solanifolii) infestation on tomatoes which did not require control treatments. Ordinary control measures failed to control COLORADO POTATO BEETLE (Leptinotarsa decemlineata) on potatoes in some sections of Long Island. The same was true to a lesser extent with respect to POTATO FLEA BEETLES on Long Island and in some up-state areas. GREEN PEACH APHID (Myzus persicae) and POTATO APHID (Macrosiphum solanifolii) not serious on potatoes, but seed potato growers treated with some regularity.

MEXICAN BEAN BEETLE (Epilachna varivestis) appeared in threatening numbers on the dry bean crop from overwintering quarters in early June. Unseasonably warm to hot weather in late June and early July killed eggs and very young larvae to the point where growers

did not need to apply control treatments. LEAFHOPPERS were major pests, requiring control on a third of the acreage. CORN FLEA BEETLES (vectors of Stewart's disease) were forecast as being likely to cause losses to sweet corn. Where from 4 to 7 control treatments were applied there was little evidence of Stewart's disease in Ulster County. Where no control was practiced there were either serious losses or some abandonment of the plantings. EUROPEAN CORN BORER (Pyrausta nubilalis) caused light to moderate losses. CORN EARWORM (Heliothis armigera) was not a serious pest. IMPORTED CABBAGEWORM (Pieris rapae) and CABBAGE LOOPER (Trichoplusia ni) needed usual control. The looper showed an apparent resistance to DDT in areas on Long Island and in smaller areas up state. Crops affected were cabbage, cauliflower and brussels sprouts. CABBAGE APHID (Brevicoryne brassicae) threatened late in the season but was kept under control by the use of phosphate compounds.

ADDITIONAL SUMMARY NOTE

MAINE - Green cloverworm (Plathypena scabra) caused widespread and severe injury in many fields of canning beans during the 1953 season. (Lathrop).

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
PLANT PEST CONTROL BRANCH
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COOPERATIVE ECONOMIC INSECT REPORT

ARMYWORM OUTBREAKS IN UNITED STATES-1953*

Armyworm (Pseudaletia unipuncta), which develops into outbreaks periodically, was again the cause of great concern in several States in 1953. The outbreak was the worst on record in Tennessee, the worst since 1911 in Indiana and probably the most widespread and serious in the history of the State, while the situation in South Carolina was the most serious in many years. Other States had similar records: West Virginia had the most severe attack since 1926; Kentucky, the worst in 25 years; Illinois, the worst in 12 years; Ohio, the most intense and widespread in 30 years in the

*Summarized from special reports supplied by Clearing Houses in the following states: Alabama, Arkansas, Connecticut, Delaware, Florida, Georgia, Illinois, Indiana, Kansas, Kentucky, Louisiana, Maine, Maryland, Michigan, Mississippi, Missouri, Nebraska, New Hampshire, New Jersey, New York, North Carolina, North Dakota, Ohio, Oklahoma, Pennsylvania, South Carolina, South Dakota, Tennessee, Texas, Vermont, West Virginia, and Wisconsin. A few supplemental notes, from reports submitted during the period of the armyworm infestation, have been added for those states from which special reports were received. No questionnaires were sent to a number of western states where armyworms were not reported during the active insect season.

(A separate of CEIR, Vol. 4, No. 2, January 15, 1954)

Wooster area and the heaviest in 23 years in southeastern counties. Connecticut reported the first appearance of the insect in 10 or 15 years. The attack in Louisiana was well above average, severest since 1948 or 1949, and probably as severe as any that has occurred in recent years. Mississippi had a very heavy infestation in the delta region while Texas had heavy local outbreaks in the north central area. Although the infestation was very severe, worst since 1949, in local areas of Oklahoma, the attack was not as severe statewide as in several recent years. Neither was the infestation outstandingly severe in Missouri; however, this State had the most general outbreak in many years. The infestation in Delaware, though heavier than the two previous years, amounted to not more than one-fifth of that of 1950. Infestations in Pennsylvania were not as general as in 1950 but were heaviest in Maryland since that year. Outbreaks were general but light in New Jersey, much smaller than usual in New York, above average in Maine but less extensive than some years, and extremely light in Michigan and Wisconsin.

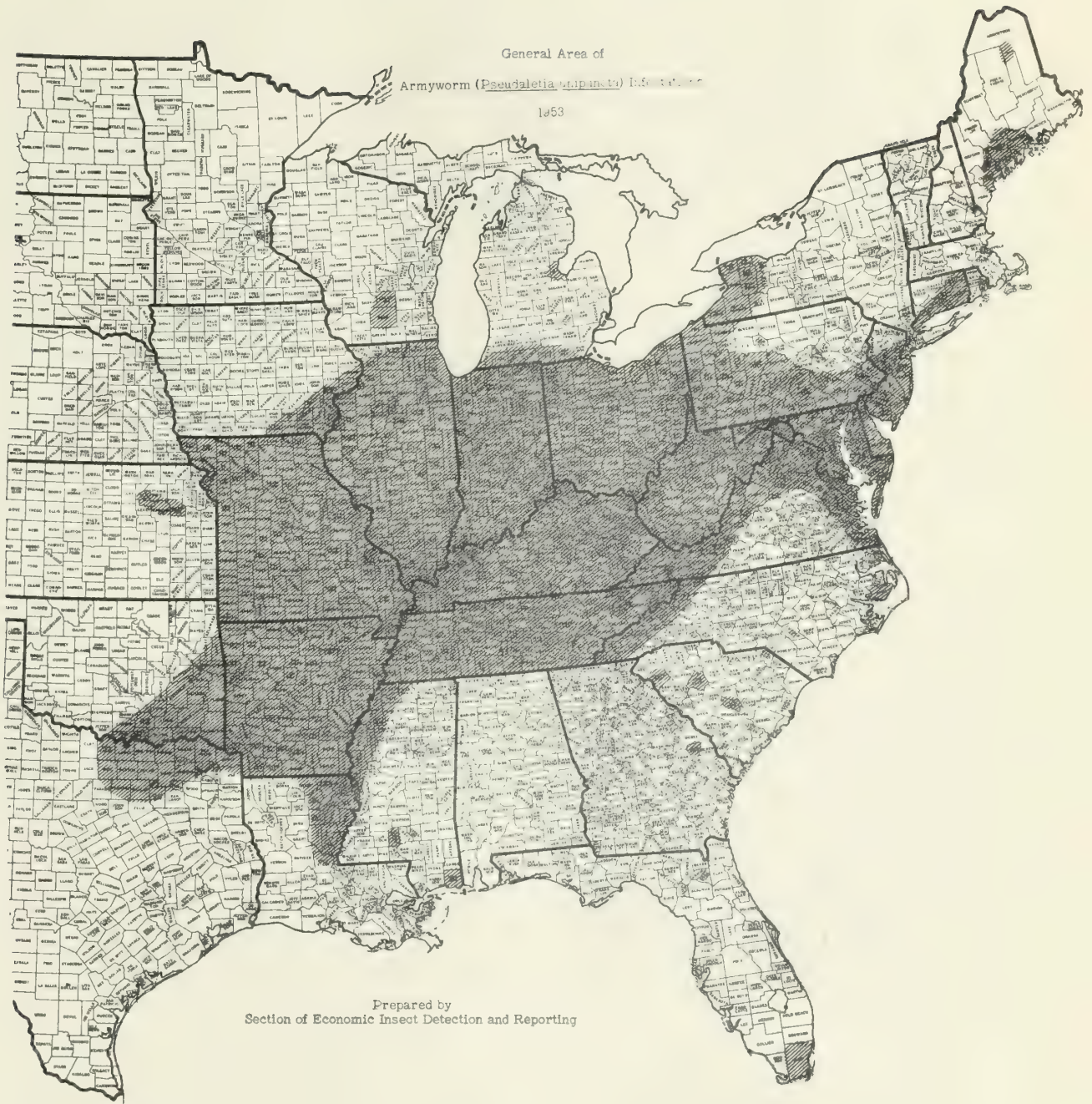
Plants attacked were primarily grains and grasses. The infestation was especially severe on wheat and oats in many States. Other small grains, corn and grasses were also damaged over wide areas, as well as alfalfa and other legumes.

According to reports, the infestations originated from sources both within and outside the reporting States. Heavy moth flights were observed at Baton Rouge, Louisiana, between November 6-20, 1952 and again between March 8-31, 1953. The damaging brood in this State probably came from moths of winter-generation migrating from southern Louisiana or still farther South. Infestations in Tennessee, Kentucky and Delaware came from moth flights both within and outside the States, while outbreaks were believed to have originated locally in West Virginia, Pennsylvania, and Connecticut. Heavy moth flights in late April and early May in southern Indiana probably gave rise to the outbreak in that State. Flights from outside areas were believed responsible for infestations in Oklahoma, Kansas, Maine, Missouri, and Illinois. In Ohio the infestation could have been due to moth flights from outside or possibly to successful hibernation within the State.

General Area of

Armyworm (*Pseudaletia unipuncta*) Infestation

1953



Prepared by
Section of Economic Insect Detection and Reporting

Cool wet weather during the spring of 1953, which promoted rank growth of vegetation and probably retarded development of parasites, primarily was held responsible for the initiation and development of the armyworm outbreaks in many States. A mild winter was believed to be a factor in Louisiana, Kentucky and Connecticut. Prevailing southerly winds during moth flights and warm weather were listed as major causes of infestations in Maine and Wisconsin.

Various factors, including natural enemies, control measures and weather, were reported as being responsible for the termination of the armyworm outbreaks. Natural enemies and control measures were credited with halting the attack in Illinois, Maryland, Pennsylvania, and North Carolina. Warm weather provided conditions favorable for development of parasites in Indiana and Missouri. A high degree of hymenopterous and dipterous parasitism was noted in the latter State as well as in Maine and Virginia. Parasites were also effective in Kansas, New York, and northeast Texas. Although parasitism by Apanteles sp. and by tachina flies served to restrict damage, and spraying was very effective in treated fields in Ohio, termination of the outbreak in that State was brought about chiefly by maturity of first-generation larvae. South Carolina reported a virus disease as being effective in several localities and there were good indications that parasites and diseases stopped the infestation in West Virginia and Oklahoma. Control measures and hot weather were credited with termination of the heavy attack in Kentucky. In addition to these factors, Tennessee listed parasites and moth migration out of the State. Weather and maturity of crops caused the disappearance of the species in Louisiana; however, control measures were important factors in preventing extensive damage. Control measures were listed as stopping the infestation in Georgia.

Control Information

Arkansas -

Approximately 6,000 acres were treated and saved from total loss. \$140,000 value of crops saved. Estimated loss to cereal crops \$20,000. Control: Toxaphene -2 lbs. actual per acre as spray, 4 lbs. as dust. Cost - \$2.00. Paris green bran bait highly effective.

- Connecticut - 75 acres of corn treated; 600 acres of hay, and 75 acres of corn lost. Control: Toxaphene - 2 lbs. per acre. Methoxychlor recommended; also early cutting of hay.
- Delaware - 800-1,000 acres of crops treated and saved. 150 acres of grain and corn lost; no complete losses. Control: Toxaphene 60%, emulsifiable concentrate 1 1/2 qts. per acre. Dust - 20%, 20 lbs. per acre. DDT 25% of emulsifiable 2 1/2 qts. per acre. Dust 5% at 35 lbs. per acre. Paris green bran bait 100 lbs. for three to five acres. Methoxychlor, 5% dust 35 lbs. Marginal furrow barrier treated with insecticide satisfactory in heavily infested areas. Marginal damage heavy, no substantial losses in forage crops.
- Florida - Insect was of minor importance and was almost completely controlled by natural enemies.
- Georgia - Little information available. Some control work performed in Jenkins County with 20% toxaphene dust.
- Illinois - 170,000 acres treated resulting in a saving of crops valued at \$1,750,000. Losses included 5 to 10,000 acres of pasture and 1 to 10% in isolated wheat fields. Treatments were applied early. Control: 1 1/2 -2 lbs. Toxaphene costing \$2.10-2.50 per acre applied by air. Dieldrin dust 1/4 lb. actual per acre; aerial application at \$2.50-3.00 per acre. Toxaphene used on 85% of control work, dieldrin 10%. Occasional applications of methoxychlor, and chlordane.

- Indiana - Excess of 300,000 acres treated resulting in \$6,000,000 saving of crops. Estimated protential damage would have exceeded \$8,000,000, but extensive and effective use of insecticides prevented most of this loss. Estimated \$2,000,000 loss unsprayed fields. Control: Toxaphene - 2 lbs. actual; 60% emulsifiable cost \$2.75 per gal. in 55 gal. lots, \$4.00 single gal.; \$2.50 per acre including insecticide for aerial application. DDT proved ineffective. Dieldrin - 1/4 lb. per acre as efficient as toxaphene; chlordane - 1 qt., 45% emulsifiable (1 lb.) fair to good results. Bran bait gave good results.
- Kansas - Some damage in Shawnee and Johnson Counties, natural enemies heavy.
- Kentucky - Estimate 1,002,503 acres infested. 200,500 acres treated. Estimated loss one county (Warren) \$1,250,000. Control: Toxaphene - 1 1/2 - 2 lbs. 95% effective, chlordane - 2 lbs., 90% effective; aldrin-.5 lb., 95%; endrin - .2 lb., 95%. 90% of all applications made by aircraft.
- Louisiana . 25,000 acres treated. Crops saved ranged to 100%. Estimated average saving of 25% or \$500,000. 90% of acreage requiring treatment treated. Control: Toxaphene, DDT, and 3-5-40 dust used, rate of 15 lbs. per acre. Some sprays used.
- Maine - Estimated value of loss to crops \$10,000. Control: DDT - 1 to 2 lbs. actual in sprays. 5% dust, 40 lbs. per acre. Losses widely scattered. Some fields total loss.

- Maryland - Some damage, severe Frederick County. Most damage Eastern Shore. 20% of acreage requiring treatment was treated. Control: Toxaphene, air and ground applications. Average cost \$2.50 per acre.
- Michigan - Damage light, probably 100 acres all outbreaks. Value of loss \$1,000. Control: Toxaphene - 2 lbs. per acre as sprays. Very efficient. Cost - \$2.00 for materials.
- Missouri - Estimated 125,000 acres treated, saving of \$15.00 per acre on average (\$1,875,000). Control: Toxaphene - 1 1/2 lbs. per acre. DDT - 1 lb. per acre. Most applications applied by air. Cost - \$2.50 per acre including insecticide. Results excellent.
- New Jersey - Estimate less than 5% of small grain treated. Control: Poison bait applied by air on several hundred acres. 300 acres treated late in season. Loss estimated 25% - 50% in yield depending on area. Control: Toxaphene - 1 1/2 lbs. per acre, DDT - 1-2 lbs. per acre as sprays. Paris green bait used and as effective as the sprays.
- North Carolina - Infestation confined two counties. Hyde County treated 200-300 acres with 50% saving. Buncombe County had less 5% of acreage affected, loss up to 50% in infested fields. 2% infested area treated. Many crops harvested early. Control: Toxaphene 20%, dust at 10-20 lbs. per acre. DDT 5% and 10% dust, 1 lb. actual per acre.

Ohio -

Damage variable over 90% area. No figures on acreage. Wheat early and safe, late crops damaged. Control: Toxaphene - 3 pints per acre at cost of \$1.10, dieldrin - 1 pint of 15% per acre, cost \$1.10, methoxychlor - 2 qts. per acre, cost \$2.00. Used in pastures and hazardous areas when necessary. Paris green or white arsenic bran bait. All treatments effective.

Oklahoma -

Estimate 3,000 acres sprayed saving 5 bushels (wheat) per acre. Estimated 20,000 acres infested, 10% damage; 1,000 acres complete loss. Over-all loss 25,000 bushels. Control: Toxaphene - 2 lbs. actual per acre, 3 lbs. required in heavy rank growth. All applications by airplane used 2 to 3 gals. spray per acre. Commercial applicators charged \$2.25 - \$2.50 per acre for 2 lb. applications and \$2.75 - \$3.00 for 3 lbs. per acre.

Pennsylvania -

Estimated 15,000 acres treated. No other acreage figures. Damage heavy when no treatment applied. Early treatments valuable. Control: Toxaphene - 3 pints per acre liquid; 10% dust 30 lbs. per acre. Chlordane - 1 qt. per acre, DDT - 1 qt. per acre. Air applications 6-7 gals. per acre. weed sprayer 15 to 30 gals. high pressure 75 gals. Average cost about \$3.00 per acre. Control excellent except on blue grass pastures.

South Carolina -

Estimated 3,000 acres treated resulting in savings of \$190,000. Estimated loss \$50,000. Control: Toxaphene 20% dust.

Tennessee - Infestation over most of State, Estimate 150,000 acres treated. Savings estimated at \$7,500,000. Loss on 150,000 additional acres needing control estimated \$7,500,000. Control: Toxaphene and DDT each at 2 lbs. per acre. Most applications by air. Reported 99% effective. Some ground application.

West Virginia - No information furnished although reported the worst infestation during period 1926-53.

Other comments pertaining to the armyworm problem: ALABAMA - No outbreaks. ARKANSAS - The frequent and very often severe outbreaks in Arkansas no longer cause much alarm among farmers and county agents. Since insecticidal control has worked so well an outbreak merely means that money has to be spent and the control job done right away. Information on the cause and what terminates an outbreak is not sufficient to forecast outbreaks. CONNECTICUT - As a whole the 1953 infestation did not cause alarm; infestations spotty and very local in nature. Usually reported when larvae were well advanced in growth. DELAWARE - First-generation moths were exceedingly abundant and second-generation larvae were plentiful in forage crops during late summer. ILLINOIS - Because of early warnings in early May and farm advisers alerting farmers, excellent and early control was very noticeable. Few people in Illinois ever recognized the seriousness of the problem or the potential to which the outbreak would have risen had action not been taken early. INDIANA - Outbreak most serious in southern half of State. Serious outbreaks in northern half more isolated and not as continuous and general. First outbreaks occurred last week of May, and reports continued through 3rd. week of June. Alertness of county agricultural agents and fine cooperation of insecticide dealers were a great aid in combatting the attack. KANSAS - Armyworm did not develop into a problem in 1953. Moths observed at lights at Manhattan during May. Larvae found in Shawnee County in June. Control measures not needed as larvae heavily parasitized.

LOUISIANA - Habits of this species need investigation very badly. For instance, where did the moths come from which appeared in vicinity of Baton Rouge during November 1952, and those that were collected in the Natchitoches area during July-October, 1953?

MAINE - Closer observations by farmers would make it possible to apply insecticides in time to prevent losses to crops now frequently caused by armyworm infestations.

MARYLAND - Evidence of a second brood in Worcester County, August 1.

MICHIGAN - Armyworms are only occasional pests in Michigan.

MISSISSIPPI - No special report information available.

MISSOURI - Armyworms could be found over entire State during peak of outbreak; however, little spraying was done in northern area. Extensive damage quite spotted.

NEBRASKA - No reports of armyworm in State during 1953.

NEW HAMPSHIRE - No known infestations.

NORTH DAKOTA - No outbreak.

PENNSYLVANIA - Control measures started early as outbreak anticipated from moths in light traps and information of the situation south of Pennsylvania from the Cooperative Economic Insect Report.

SOUTH DAKOTA - No known infestations.

SOUTH CAROLINA - Light traps may have value in forecasting outbreaks, but heavy moth flights frequently fail to materialize into heavy infestations. Why?

TEXAS - No special report information available.

VERMONT - No known infestations.

WISCONSIN - Appeared to be little armyworm invasion, although conditions favorable.

